ABSTRACT

3D SCANNING OF MATISSE, *THE BACK I – IV*: ONE THING AFTER ANOTHER

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Matisse created *Back*, his largest sculpture in 1908/1909. Matisse resculpted *Back* three times over the next twenty-one years (1913, 1917, 1930/31), each time beginning with a plaster cast of the previous state. He also preserved a plaster version of each state, and, cast in bronze they are the works we know today—*Back I*, *Back II*, *Back III*, and *Back IV*. The bronzes were cast beginning around 1948 and the edition was completed over 30 years later, around 1981. Each of the four versions of *Back* is an edition of 12, making the total number of casts 48.

Until 1954, only three versions were known: *Back I, III* and *IV*. After Matisse's death in 1954, a hitherto unknown *Back*, today known as *Back II*, was discovered in his warehouse, ready for shipping to the foundry, but never sent. Based on descriptions from the Matisse family and formal art historical analysis, art historians had always assumed that the reliefs were made sequentially, basing the next version on a plaster of the previous version. However, immediately after the surprise discovery of *Back II*, even Matisse scholars were unsure of its placement in the series.

The goal of the recent research into Matisse, *Back I – IV* was to determine the sequencing of the *Back*s. The examination was performed on the four MoMA bronze casts. Laser scanning and close visual examination of minute casting details proved that the casts were sequential and Matisse left large parts of the background alone as he reworked the central figure. In the background, features that appeared on *Back I* were repeated on *Back II*. Features that appeared for the first time on *Back II* were repeated on *Back III*. Features on *Back III* appeared on *Back IV* and nowhere else.

The 3D data captured from laser scanning empowered researchers to analyze and compare the sculptures using CAD software. Each sculpture was scanned independently, with particular attention to the selected features that could confirm the sequence. Digital models of each sculpture were aligned in a common coordinate system by matching up the selected features. Once all four sculptures were aligned, overlays, color maps, cross sections, and animations provided the insights into the relationships of the sculptures.

An overlay is an observation of two or more of the sculptures occupying the same virtual space simultaneously. By adjusting colors and transparency levels, similarities and differences become readily evident on a qualitative level

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Overlay of *Back* II (yellow) and *Back* III (red).

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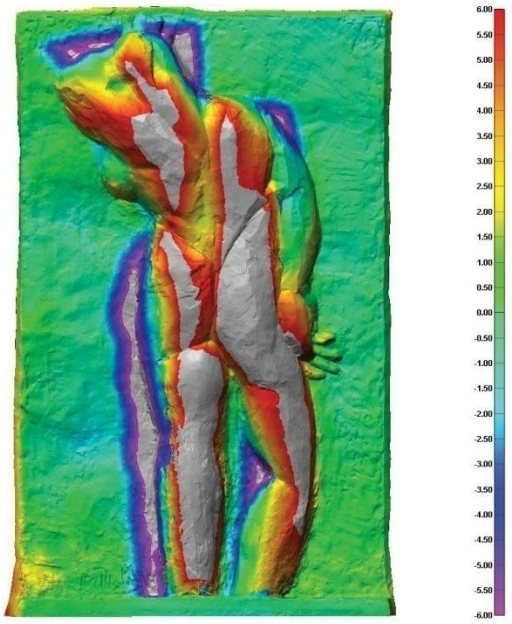
A color map is a dimensional deviation plot which presents the sculpture colored with a spectrum where the colors represent the deviation between two sculptures. This is a more quantitative method of comparing two sculptures.



Color Deviation Analysis of *Back* II and *Back* III.

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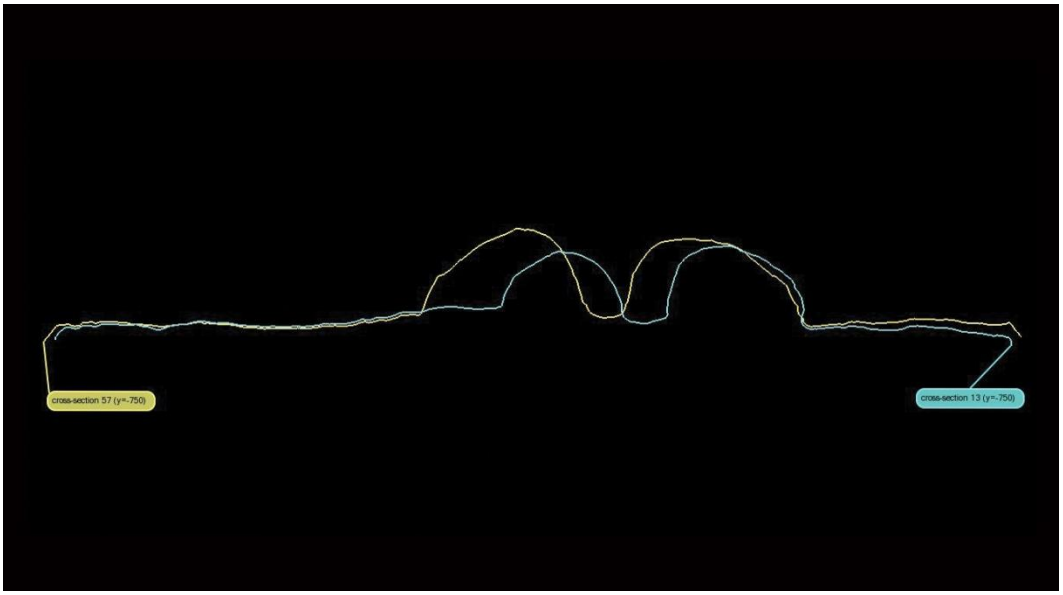
The most telling comparisons came in the cross sections. By virtually slicing the aligned digital models through x/z and y/z planes into cross section lines, similarities and differences in each pair of sculptures were illustrated. Figural changes were major but the backgrounds were often identical from one sculpture to the next.



Horizontal Cross Section Comparing *Back* I (blue) to *Back* II (yellow) across the legs.

The data obtained by laser scanning answered the questions of sequencing, and the method of artistic creation.

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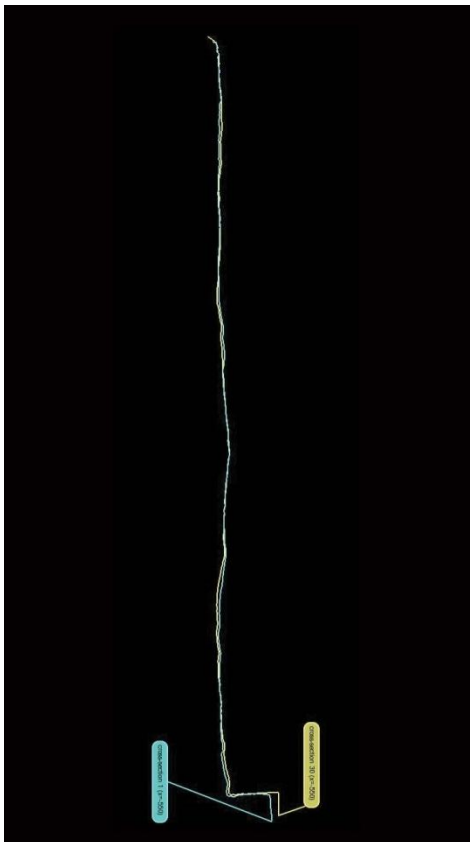

Figure 1 Vertical Cross Section Comparing *Back* I and *Back* II along the right side of the background.

BIOGRAPHIES: Zycherman, Abramson, Woodburn

Lynda Zycherman studied at the Conservation Center, and at the Metropolitan Museum with Pieter Meyers. In 1975 she became Conservator at the Freer Gallery of Art, working with Tom Chase. Her specialty was the technical examination of ancient Chinese material, especially the techniques of ceremonial bronze manufacture. With Elisabeth West FitzHugh, she discovered, identified, and characterized two, hitherto unknown, artificially produced Chinese pigments, Han blue and Han purple.

Lynda joined the Sculpture Conservation Laboratory at the Museum of Modern Art in 1984. She has researched a wide variety of topics including Minimalist sculpture, sculpture utilizing electric lights, Fluxus, and Brancusi's bronze sculptures.

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Joe Nicoli graduated from Beloit College in 1996 with a Bachelor of Art Degree in Anthropology. Before joining Direct Dimensions earlier this year, Joe worked all around the Southwestern United States. He worked on archaeological digs for the Navajo Nation and worked on a ruins stabilization crew for the National Park Service. In the last 12 years, he has laser scanned and mapped over 100 archaeological sites for The National Park Service and other clients using a variety of scanning and surveying systems. He is an expert in field data capture and the development of 2D and 3D graphics for documentation, conservation, analysis, and education.

Harry Abramson graduated from James Madison University in 1989 with a Bachelor of Science Degree in Economics. With a career in technical sales and project management along with a love and respect for the arts, Harry joined Direct Dimensions in 2004 to develop technical solutions serving the art industry. Harry's work has helped countless sculptures to be realized in every scale, material, and price range imaginable for artists ranging from world renowned to local students. Furthermore, Harry has directed projects that have yielded research and/or archival data for Museums including the Museum of Modern Art NY, National Gallery of Art, The Baltimore Museum of Art, the Smithsonian Institution, and many others.

Glenn Woodburn graduated from Towson University with a Bachelor of Science degree in Industrial Design in 2004. Glenn started working with Direct Dimensions as an intern while at Towson was hired full-time upon graduation. With 8 years experience, Glenn serves as a technical project manager specialized in on-site high-resolution laser scanning projects spanning the art, architecture, historic preservation, film, medical, aerospace, military and product design worlds. Glenn has extensive knowledge in all current and emerging 3D measurement and digital modeling technologies

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